

C/05 10/17/99  
IPEAUS 15 APR 1999- 41 -  
- 92 -

## WHAT IS CLAIMED IS:

1. - 22. (Canceled)

SUB  
D1

23. A method of killing or inhibiting growth of bacteria comprising contacting said bacteria with a peptide nucleic acid.

24. The method of claim 23 wherein said peptide nucleic acid is complementary in an anti-parallel orientation to a region of ribosomal RNA of said bacteria.

25. The method of claim 23 wherein said peptide nucleic acid is complementary in an anti-parallel orientation to a region of messenger RNA of said bacteria.

26. The method of claim 25 further comprising contacting said bacteria with at least one antibiotic.

27. The method of claim 23 wherein said peptide nucleic acid is from about 5 to about 40 monomer units in length.

28. The method of claim 23 wherein said peptide nucleic acid is from about 6 to about 25 monomer units in length.

29. The method of claim 23 wherein a portion of said peptide nucleic acid is complementary in an anti-parallel orientation with a region of ribosomal RNA of said bacteria and a further portion of said peptide nucleic acid is complementary in an anti-parallel orientation with a region of messenger RNA of said bacteria.

30. The method of claim 29 further comprising contacting said bacteria with at least one antibiotic.

AMENDED SHEET

42  
- 93 -

31. A process for determining the function of a target gene in a bacteria comprising the steps of:

- a) selecting a target gene within said bacteria;
- b) providing a nucleotide sequence of said target gene;
- c) selecting and preparing one or more PNA compounds each having a region that is complementary, in an anti-parallel orientation, to a portion of said nucleotide sequence of said target gene;
- d) determining the activity of said one or more PNA compounds in a selected assay to identify active PNA compounds;
- e) contacting said bacteria with said active PNA compounds; and
- f) determining the effect of said one or more PNA compounds on said bacteria.

32. The process of claim 31 wherein said selected assay of step c) is and *in vitro* assay.

33. The process of claim 31 wherein said selected assay of step c) is an *in vivo* assay.

34. The process of claim 32 wherein said *in vitro* assay comprises contacting said one or more PNA compounds with a cell free extract containing said target gene from said bacteria.

35. The process of claim 31 wherein the gene product of said target gene is a polypeptide.

36. The process of claim 35 wherein said portion of said nucleotide sequence of said target gene comprises the start codon of an open reading frame.



15 APR 1999

43  
- 94 -

37. The process of claim 31 wherein the gene product of said target gene is an RNA molecule.

38. The process of claim 31 wherein said target gene is located on a chromosome located on an episome of said bacteria.

39. A method of treating a mammal suffering from a bacterial infection comprising administering one or more peptide nucleic acid compounds to said mammal.

40. The method of claim 39 wherein said peptide nucleic acid is complementary in an anti-parallel orientation to a region of ribosomal RNA of said bacteria.

41. The method of claim 39 wherein said peptide nucleic acid is complementary to a region of mRNA of said bacteria.

42. The method of claim 39 further comprising concurrent treatment with an antibiotic.

43. A method of disinfection comprising:  
selecting an object to be disinfected;  
contacting said object with peptide nucleic acid; and  
rinsing said object with a sterile liquid to remove said peptide nucleic acid.

44. The method of claim 43 wherein said peptide nucleic acid is in the form of a solution and said object is contacted with said solution over substantially all solvent accessible areas of said object.

45. An antibacterial pharmaceutical composition comprising one or more peptide nucleic acid compounds.

AMENDED SHEET

IPEAUS 15 APR 1999

44  
- 95 -

46. The antibacterial pharmaceutical composition of claim 45 further comprising a pharmaceutically acceptable carrier or diluent.

47. The antibacterial composition of claim 45 having bacteriostatic properties.

48. The antibacterial composition of claim 45 having bacteriocidal properties.

49. The antibacterial composition of claim 45 wherein said one or more peptide nucleic acid compounds are targeted to an essential bacterial gene.

50. The antibacterial composition of claim 48 wherein said one or more peptide nucleic acid compounds are targeted to a bacterial gene conferring resistance to one or more antibiotic agents.

51. The antibacterial pharmaceutical composition of claim 49 further comprising a  $\beta$ -lactam antibacterial agent.

52. A pharmaceutical composition comprising two or more PNA compounds that inhibit the viability or growth of a bacterial species or the resistance of said bacterial species to one or more antibiotic compounds.

53. The pharmaceutical composition of claim 52 further comprising one or more antibiotic compounds.

54. A method of treating a mammal suffering from a bacterial infection comprising administering to said mammal the pharmaceutical composition of claim 53.

Added  
A1

AMENDED SHEET